

Appl. No. 10/676,277
Amdt. dated July 1, 2008
Reply to Office Action of April 9, 2008

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 (Previously presented). A method to identify sub-regions of a multi-channel image as containing red-eye, said method comprising:

- (a) converting said multi-channel image to a modified multi-channel image wherein at least one of said channels is an enhanced luminance channel that has more than 60% of the luminance information of said multi-channel image and at least one of said channels is a saturation channel; and
- (b) identifying a sub-region of said image as containing a red-eye region based upon, at least in part, processing said saturation channel by applying a saturation mask to one or more pixels of said image, said saturation mask comparing the standard deviation of the saturation value of a respective pixel to a threshold.

2 (Previously presented). The method of claim 1 wherein said standard deviation of said saturation value of a respective pixel is measured relative to the mean saturation of pixels in a neighborhood local to said respective pixel.

3 (Previously presented). The method of claim 1 wherein said modified multi-channel image has hue, saturation, and intensity channels.

4 (Previously presented). The method of claim 3 wherein said saturation channel represents the relative bandwidth of the visible output from a light source.

5 (Original). The method of claim 4 wherein said hue is substantially the wavelength within the visible-light spectrum at which the energy output from a source is the greatest.

6 (Previously presented). The method of claim 1 wherein said threshold is 0.15.

7 (Previously presented). A method to identify sub-regions of a multi-channel image containing red-eye comprising:

- (a) providing said multi-channel image wherein at least one of said channels has more than 60% of the luminance information of said multi-channel image and at least one of said channels is a saturation channel; and
- (b) identifying a sub-region of said image as containing a red-eye region based upon, at least in part, processing said saturation channel by applying a saturation mask to one or more pixels of said image, said saturation mask comparing the standard deviation of the saturation value of a respective pixel to a threshold.

8 (Original). The method of claim 7 wherein said modified multi-channel image has hue, saturation, and intensity channels.

9 (Original). The method of claim 8 wherein saturation is the relative bandwidth of the visible output from a light source.

10 (Original). The method of claim 9 wherein said hue is substantially the wavelength within the visible-light spectrum at which the energy output from a source is the greatest.

11 (Original). The method of claim 7 wherein each channel of said multi-channel image is processed differently to identify said sub-region of said image.

12 (Currently amended). A method to identify sub-regions of a multi-channel image containing red-eye, said multi-channel image having at least a first channel and a second channel, said method comprising:

- (a) identifying a sub-region of said image as containing a red-eye region based upon, at least in part, applying a first mask to said first channel, said first mask comparing a first statistic statistical measure of at least one pixel of said image to a first threshold; and

(b) applying a second mask to said second channel, said second mask comparing a second statistic statistical measure of at least one pixel of said image to a second threshold, said second statistic statistical measure-being a different statistical property than said first statistic statistical measure.

13 (Currently amended). The method of claim 12 where said first statistic statistical measure is the intensity value of said pixel in said first channel and said second statistic statistical measure is the standard deviation of said pixel in said second channel.

14 (Previously presented). The method of claim 12 wherein said first threshold is different than said second threshold.

15 (Previously presented). The method of claim 13 wherein said standard deviation is measured relative to a mean measured over a neighborhood of pixels local to said pixel.

16 (Previously presented). The method of claim 13 wherein the value for said second threshold is 0.15.

17 (Previously presented). The method of claim 13 where said second channel represents saturation.

18 (Previously presented). The method of claim 12 further comprising using a convex hull technique to identify contiguous regions.

19 (Previously presented). The method of claim 18 wherein contiguous regions having a size less than a threshold are removed as potential red-eye regions, said threshold computed dynamically based on the size of the input image.

20 (Previously presented). A method to identify sub-regions of a multi-channel image containing red-eye, said method comprising:

- (a) providing said multi-channel image comprising luminance, hue, and saturation channels, respectively;
- (b) identifying a sub-region of said image as containing a red-eye region based upon, at least in part:
 - (i) filtering out selective pixels of said image based upon a first mask applied to said luminance channel, said mask comparing the luminance value of respective pixels in said image to a first threshold;
 - (ii) thereafter applying a convex hull technique to group remaining pixels of said image into a plurality of contiguous regions;
 - (iii) thereafter applying a second mask to said hue channel, said second mask comparing the hue value of respective pixels in said plurality of contiguous regions to a second threshold;
 - (iv) subdividing said plurality of contiguous regions into a plurality of contiguous sub-regions based upon said second mask and a connected component technique; and
 - (v) filtering out the pixels in selective sub-regions based upon a comparison of the aspect ratio of respective said sub-regions to a third threshold.

21 (Previously presented). The method of claim 20 including the step of applying a third mask to said saturation channel said third mask comparing the standard deviation of the saturation value of respective pixels in said plurality of contiguous sub-regions to a fourth threshold.

22 (Previously presented). The method of claim 21 wherein said fourth threshold is 0.15.

23 (Previously presented). A method to identify sub-regions of a multi-channel image containing red-eye comprising:

- (a) providing said multi-channel image wherein at least one of said channels substantially includes the saturation of said image; and

Appl. No. 10/676,277
Amdt. dated July 1, 2008
Reply to Office Action of April 9, 2008

- (b) identifying a sub-region of said image as containing a red-eye region based upon, at least in part, processing said channel that substantially includes said saturation to identify location variations in said saturation based upon the standard deviation of the saturation value of pixels in said channel that substantially includes said saturation.

24-26 (Canceled).